Appendix G Cloud Assessment Services Description

AT&T Cloud & Data Center Technical Services Practice Overview

IT organizations are experiencing a complete shift in the thought process on how to deliver application services. With the advancement and maturity of cloud technologies and the proliferation of cloud providers offering cloud-based services, many IT organizations are re-thinking the data center and what it means to deliver application services to end users. This paradigm shift is driving adoption of cloud services in conjunction with traditional data center delivery. Virtualization of traditional application services allows organizations of all sizes and various industries to take advantage of a more efficient and flexible way to organize, manage, deliver and consume IT services.

But the cloud model is more than just a set of new technologies – it is a new approach for provisioning and managing IT resources within an organization. You recognize and understand the many benefits that a cloud model can provide your business – but are you taking full advantage of the potential of Cloud?

AT&T Technical Services provides a set of lifecycle services to help you embrace and optimize your Cloud and Data Center environment, whether you are in need of an effective strategy and roadmap, need to refresh your business continuity plans, or require experienced support in the architecture, design and transformation of the data center environment.

Cloud & Data Center Strategy and Roadmap

Many organizations understand the benefits of virtualization and cloud computing but are challenged with determining a sound transformation strategy which supports the migration from a traditional data center infrastructure to an infrastructure utilizing an optimized cloud model. There is not a "one size fits all" solution when it comes to determining the best cloud environment for your business – and more importantly, how to best integrate the cloud with your existing business infrastructure and processes. Many organizations are simply not staffed with the personnel resources and expertise necessary to create a comprehensive transformation plan towards a cloud model.

Transforming the data center requires the development of solution strategies around applications, the platforms they sit on and where they physically reside. Many customers struggle with how to align what applications can fit in the cloud, which cloud model is suitable - public, private, or hybrid, and what the migration strategy should be to those cloud environments.

AT&T Technical Services has developed a Strategy and Roadmap service to address these specific needs, and help customers navigate the complex cloud landscape in order to put in place strategies for transforming their data center. The Cloud and Data Center Strategy and Roadmap offering delivers a comprehensive enterprise-wide strategy for customers that need to optimize their current data centers and/or adopt cloud-based services. The service provides a technology roadmap and supporting business case for the deployment of a next generation data center, cloud, and Business Continuity/Disaster Recovery (BC/DR) solution. Our Technical Services professionals work with customer IT and business representatives to identify strategic imperatives and requirements, map the current production data center environment against future requirements, and analyze viable solution alternatives as part of a technology roadmap for adoption of next generation data center and cloud solutions.

AT&T's prior experience as a Cloud and Data Center Transformation expert indicates that successful cloud deployments must reach answers to the following questions *before the Enterprise commences* the journey toward cloud

1. How do I determine the best way to consume cloud services for my organization?
2. Which services should I source externally versus build internally?
3. How will I migrate my applications and data to the selected cloud service?
4. How can I integrate the cloud environment into my current operational platform?
5. How will I manage my service levels moving forward?

Questions 1 thru 3 can be answered by a Cloud Strategy and Roadmap engagement. The engagement utilizes the following methodology to find the appropriate answers to those questions:

- **Discovery - Requirements Definition** – To identify all of the technical and business requirements for the cloud solution

- **Discovery – Assessment of Current State** – How are services provided today?
    - **Infrastructure Discovery**– What technologies are currently utilized within the environment?
        - What are the current server, virtualization, network and storage architectures utilized in the current environment?
        - What impact will cloud technologies have on existing security policies and data privacy and management platforms?
        - What is the current BC/DR approach and what impact will a cloud model have on that approach?

    - **Application Discovery**– Discovery of the application footprints, application dependencies and machine-to-machine application flows. The discovery also helps answer the questions as to what applications can be economically moved to a cloud environment

- **Synthesize Information & Develop Solution Alternatives** –The determination of the appropriate solution alternatives (IaaS, PaaS, StaaS, SaaS, Enterprise Private Cloud or Managed Hosting) from the list of identified feasible alternatives. Once the discovery and characterization of the applications is completed the applications are analyzed to ascertain if they are candidates for Cloud services and/or Data Center transformation and optimization

- For those applications which are candidates for Cloud services, we further analyze them by Cloud model
    - Which applications are candidates for CaaS services?
    - Which applications are candidates for IaaS Services?
    - Which applications are candidates for PaaS Services?
    - Which applications are candidates for "other" outsourcing or out tasking arrangements?

- This step requires a detailed analysis of multiple factors for the applications including the following:
    - Platform requirements
    - Storage requirements
    - Platform Consolidation
    - Migration considerations
    - Licensing
    - Sunsetting of applications
    - Costs to migrate unvirtualized environments to a virtualized environment
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- **Solution Recommendation & Roadmap Development** –Justification and rationalization for the recommendations made, including business case justifications and required budgetary planning to execute the recommendations. This phase also creates the following migration deliverables:
    - **Application Installation Method of Procedures (MOP)** – AT&T will work with Agency staff and partners to review and gain an understanding of the precise installation steps for the applications to be migrated focusing on migration steps utilizing Physical-to-Virtual (P2V), Virtual-to-Virtual (V2V), and Virtual-to-Physical (V2P) migration methods. These methods will be documented in a MOP

format. The MOP also address the backout process to be used in the event that the migration process fails during the defined migration window.

- **Data Transfer MOP** – A MOP focusing on the migration of data to virtual storage (if required) will also be created to support any transfer of local data to virtual storage on the selected cloud platform or archival data for purposes of long-term storage or disaster recovery purposes. The MOP will set forth the necessary CPE device specifications and configuration values for configuring external connections to the cloud or Storage as a Service infrastructure and the ability to upload database backups and virtual machine (VM) images to the cloud platform. The MOP also address the backout process to be used in the event that the migration process fails during the defined migration window.
- **Migration Timeline** – The creation of a Migration Timeline setting forth tasks and required resources to support the transformation to the new environment

Once Questions 1 thru 3 are satisfactorily answered, we can then turn our focus on questions 4 thru 5. The most effective approach to achieve this is to define and design a Common Cloud Management Platform ("CCMP"). The CCMP exposes a set of business and operational management focused services as well as provisioning, orchestration, federation and management services.

The CCMP also includes User Interfaces serving the three main roles defined within the CCMP

- A Service Consumer Portal to be used by Cloud Service Consumers for self-service delivery, provisioning & management (the actual cloud service instances are used via a cloud service specific UI)
- A Service Provider Portal serving Cloud Service Provider internal users & administrators for daily operations ; and
- A Service Development Portal used by Cloud Service Creators.

CCMP functionality is accessible via APIs exposed by the CCMP-internal components. As the name already implies, the CCMP is structured as a platform. Based on the platform nature, the CCMP exposes a set of services which can (and sometimes must) be used within the context of a specific cloud service. The management services exposed by the CCMP to cloud service creators are not to be confused with the cloud services developed by cloud service creators.

At this point, enough information is in hand to facilitate the evaluation of integration approaches as well as a determination of how service levels can be appropriately managed in connection with the recommended solution alternative.

In conclusion, successful cloud migration has to be treated as a detailed process:

- Strategy and Roadmap is the first step
- Readiness Assessment is the second step
- Migration and Transformation is the final step

Infrastructure and Application discovery is the key to identifying applications which can be transitioned to cloud services, particularly since certain applications often function better in certain cloud models. The integration of orchestration, management, provisioning and federation into existing Enterprise IT infrastructure becomes the key process in terms of successfully operationalizing cloud services.

Business Continuity Planning

This service focuses on the development of a Business Continuity Plan through the execution of detailed risk assessments and business impact determination in the context of a global enterprise. Our methodology supports the development of Business Continuity Plan modules, (such as a Disaster Recovery Plan and Runbooks), Disaster Recovery Response Team responsibilities and the process for recovering from a declared disaster event impacting IT, facilities, human resources and communications.

AT&T Technical Services executes a detailed discovery and collection of the relevant information necessary to perform a Risk Assessment and a Business Impact Analysis. The following critical data is collected:

- Discovery of Lines of Business – Articulation of the major lines of business functioning within the organization. The specific business groups are pre-defined as part of scoping with the customer.
- Identification of Critical Business Processes supporting the identified Lines of Business
- Definition of Application Criticality and Dependencies – This includes the discovery of application dependencies (both internal and external), and the criticality of applications, as usually expressed via application classifications or RPO/RTO metrics
- IT Architecture for High Availability – Discovery of IT systems, architecture, redundancy and resiliency mechanisms
- Facilities – An analysis of data center facilities focusing on environmental and structured distribution resiliency as well as high availability, security and recoverability best practices

Cloud and Data Center Architecture and Engineering

This offering provides architecture formulation and design of high density server and SAN solutions (from both a physical and virtual perspective) to facilitate customer adoption of next generation technologies for virtualization, fabric enablement and disaster recovery within and across data center and cloud environments. These engagements also encompass data center and colocation facility engineering from a structured distribution, rack layout and power distribution perspective.

Within a service-oriented data center, it is paramount to identify and design an optimum high density server and storage infrastructure in order to match expected application performance and availability characteristics on an end-to-end basis. AT&T Technical Services follows a standard, proven approach that focuses on the identification of touch points within the current environment, creation of configuration standards, development of high level and low level designs and bill of materials and the development of implementation plans for deployment of these infrastructures.

In addition to the server, storage and network infrastructure, the facility infrastructure (cooling, power, and physical plant), must be in equilibrium with the IT infrastructure to ensure continuity of critical services. The business demands of adding more and more IT equipment (servers, SAN, routers, switches etc.) to the data center floor not only impacts the physical space occupied, but can also overburden MEP (mechanical, electrical and plumbing) systems.

AT&T Technical Services can provide assistance with evaluation of the current data center facility and existing IT infrastructure from an IT and MEP impact analysis perspective, collection of IT asset and MEP configurations, and the development of facility recommendations with cost benefit analysis for improvement and optimization.

Cloud and Data Center Transformation

As a business evolves, so does its IT domain and the associated need to continuously refresh and change its computing facilities. Corporations also evolve inorganically, through mergers, acquisitions, and divestitures. In many cases, these corporations end up with a plethora of data centers and an unbalanced capital and operational cost structure. With an increased emphasis on cost reduction and simplification of the IT operating model, companies are looking to downsize, consolidate, and optimize their data center assets.

Data Center migrations can be a very daunting task for even the most seasoned IT organization. Successful migrations require extensive planning, program governance and preparation to minimize risks and service continuity impacts. A focus on planning limits the risk of potential rework and back-outs and is a principal tenet of our methodology.

AT&T Technical Services can assist in this life cycle by providing the subject matter expertise to plan, implement and execute a planned transition to a Cloud solution, to facilitate a Data Center Transformation or to deploy a BC/DR solution.   This offering assists our customers manage the logistics, leadership and technical resource coordination necessary to successfully execute a transformation strategy.   Our methodology also provides the necessary Program Governance and Project Management resources for Cloud Migration and Data Center Transformation.

Our methodology evaluates the selected strategic vision to consolidate and/or transform supporting that vision with a pragmatic plan for consolidation and relocation. Key program activities include the validation of corporate strategy, the determination of key sourcing strategies (in-source, outsource, co-source), the establishment of target state requirements and architecture, an analysis of migration strategies, and the development of customized consolidation recommendations and/or relocation plans in support of data center transformation.

AT&T Technical Services leverages our migration methodology and program governance approach, which are a culmination of our previous experience and industry best practices to meet even the most demanding of schedules and complexity.